

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method for optically inspecting a sample, the method comprising:

illuminating the sample with an incident field and obtaining a resulting output field;

measuring the resulting output field to determine an optical response of the sample;

generating measurement parameters that correspond to the measured optical response by performing the following operations:

a) searching a database comprising pre-computed optical responses associated with sets of parameters to locate [[a]] the one pre-computed optical response that most closely matches the determined optical response,

b) interpolating, based on the said one pre-computed optical response and the parameter sets in the database, to generate an interpolated optical response that matches the determined optical response within a first defined termination criterion, and

c) iteratively evaluating a theoretical model to refine the interpolated optical response until the refined interpolated optical response matches the determined optical response within a second defined termination criterion and determining the measurement parameters therefrom.

2. (Original) A method as recited in claim 1 that further comprises the step of iteratively evaluating the theoretical model to generate the database.

3. (Original) A method as recited in claim 1 wherein the step of interpolating is performed without evaluating the theoretical model.

4. (Previously Presented) A method as recited in claim 1 wherein the database searching, database interpolation and iterative evaluation operations are performed in sequence to successively refine an optical response and determine the measurement parameters.

5. (Original) A method as recited in claim 1 wherein the database interpolation is performed using reduced multicubic interpolation.

6. (Original) A method as recited in claim 1 wherein the operations a, b and c are performed in order.

7. (Currently Amended) A device for optically inspecting a sample, the device comprising:

a measurement system for illuminating the sample with an incident field and generating a resulting output field, the measurement system operable to measure the resulting output field to determine an optical response of the sample;

a database including sets of sample parameters and associated pre-computed optical responses;

a processor for generating measurement parameters that correspond to the measured determined optical response, the processor configured to include:

a database searching module for searching [a] the database to locate a pre-computed optical response that best matches the determined optical response;

[[a]] an interpolated refinement module for interpolating based on the best matched pre-computed optical response and the parameter sets in the database to generate an interpolated optical response that more closely matches the determined optical response; and

a theoretical refinement module for iteratively refining the interpolated optical response using a theoretical model and determining generating the measurement parameters therefrom.

8. (Currently Amended) A device as recited in claim 7 wherein the database is generated by iteratively evaluating the theoretical refinement model.

9. (Currently Amended) A device as recited in claim 7 wherein the interpolated refinement module operates without evaluating the theoretical ~~refinement~~ model.

10. (Currently Amended) A device as recited in claim 7 wherein the database searching module, database the interpolation refinement module and iterative evaluation operations are invoke the theoretical refinement module are invoked in sequence to successively refine an optical response and determine the generation of measurement parameters.

11. (Currently Amended) A method of evaluating a sample comprising the steps of:  
illuminating the sample with an incident field and generating a resulting output field;

measuring the resulting output field to determine a measured optical response of the sample;

searching within a database of pre-computed optical responses and associated sets of measurement parameters to locate the pre-computed optical response that most closely matches the measured optical response;

interpolating to refine the pre-computed optical response obtained from the database located in the database during the searching step and using the parameter sets in the database to more closely match the measured optical response; and

iteratively evaluating a theoretical model to refine the optical response obtained by interpolation to more closely match the measured optical response.

12. (Original) A method as recited in claim 11 that further comprises the step of iteratively evaluating the theoretical model to generate the database.

13. (Original) A method as recited in claim 11 wherein the step of interpolating is performed without evaluating the theoretical model.

14. (Original) A method as recited in claim 11 wherein the database interpolation is performed using reduced multicubic interpolation.

15. (Currently Amended) A method of evaluating a sample comprising the steps of:  
creating a database of pre-computed optical responses and corresponding sets of  
pre-computed measurement parameters of the sample;  
optically inspecting the sample to generate an empirical optical response;  
comparing the empirical optical response to the pre-computed optical responses  
stored in the database and selecting the closest match;  
using the closest match, interpolating using the parameters sets of the database to  
generate an interpolated optical response; and; and  
using the interpolated optical response as a starting point, iteratively evaluating a  
theoretical model corresponding to the sample to minimize the difference between  
theoretically generated optical responses and the empirical optical response to produce a  
best fit for the actual measurement parameters of the sample.

16. (Original) A method as recited in claim 15 that further comprises the step of  
iteratively evaluating the theoretical model to generate the database.

17. (Original) A method as recited in claim 15 wherein the interpolated optical  
response is generated without evaluating the theoretical model.

18. (Original) A method as recited in claim 15 wherein the interpolated optical  
response is generated using reduced multicubic interpolation.